

Listing of The Claims:

The following Listing of the Claims will replace all prior versions and all prior listings of the claims in the present application:

1. (Currently Amended). A method of detecting a precancerous lesion resulting from a mucosal papilloma virus infection in an organism, the method comprising detecting vegetative mucosal papilloma viral DNA replication in a sample of cells from said organism as indicated by mucosal papilloma virus-E4 protein expression, wherein the detection of said virus-E4 protein comprises the steps of:

contacting in vitro a sample of the organism's cells from the site of potential infection with a molecule that binds specifically to mucosal papilloma virus-E4 protein; and  
monitoring said binding,

wherein specific binding by said molecule to mucosal papilloma virus-E4 protein indicates the presence of mucosal papilloma virus-E4 protein expression and the detection of vegetative mucosal papilloma viral DNA replication, thereby detecting a precancerous lesion resulting from a mucosal papilloma virus infection in an organism.

2. (Previously presented). The method according to claim 1, wherein the organism is a mammal.

3. (Previously presented). The method according to claim 2, wherein the organism is a human and the papilloma virus is human papilloma virus (HPV).

4. (Previously presented). The method according to claim 2, wherein the site of potential infection is the cervix.

5. (Previously presented). The method according to claim 3, wherein the human papilloma virus is selected from the group consisting of HPV types 16, 18, 33, 35, 45, 51, 52, 56, 58 and 61.

6. (Canceled).

7. (Currently Amended). The method according to claim 1, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of: contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.
8. (Previously presented). The method according to claim 1, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.
9. (Previously presented). The method according to claim 8, wherein the hydrophilic region is the region which possesses the sequence RPIP KPSPWAPKKHRRLLSSDQDSQTP (SEQ ID NO:4) in HPV16, or its homologue in other papilloma viruses.
10. (Currently amended). The method according to claim 9, wherein the hydrophilic region is the region which possesses the sequence R[R]PIP KPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.
11. (Previously presented). The method according to claim 10, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.
12. (Previously presented). The method according to claim 1, wherein the molecule capable of binding to a papilloma virus E4 protein is an antibody or an antigen binding fragment thereof.
13. (Canceled).
14. (Previously presented). The method according to claim 3, wherein the site of potential infection is the cervix.
15. (Previously presented). The method according to claim 2, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of: contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.
16. (Previously presented). The method according to claim 3, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of:

contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.

17. (Previously presented). The method according to claim 4, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of: contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.

18. (Previously presented). The method according to claim 5, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of: contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.

19. (Previously presented). The method according to claim 14, further comprising determining the type(s) of HPV infection in the organism, said determination comprising the steps of: contacting the cells with a molecule that binds specifically to a subset of HPV E4 proteins; and monitoring said binding.

20. (Previously presented). The method according to claim 2, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

21. (Previously presented). The method according to claim 3, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

22. (Previously presented). The method according to claim 4, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

23. (Previously presented). The method according to claim 5, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

24. (Previously presented). The method according to claim 7, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

25. (Previously presented). The method according to claim 14, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

26. (Previously presented). The method according to claim 15, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

27. (Previously presented). The method according to claim 16, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

28. (Previously presented). The method according to claim 17, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

29. (Previously presented). The method according to claim 18, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

30. (Previously presented). The method according to claim 19, wherein the molecule capable of binding to the papilloma virus E4 protein is capable of binding within a hydrophilic region of the E4 sequence.

31. (Previously presented). The method according to claim 20, wherein the hydrophilic region is the region which possesses the sequence RPIP KPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

32. (Currently amended). The method according to claim 31, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

33. (Previously presented). The method according to claim 32, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

34. (Previously presented). The method according to claim 21, wherein the hydrophilic region is the region which possesses the sequence RPIPKPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

35. (Currently amended). The method according to claim 34, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

36. (Previously presented). The method according to claim 35, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

37. (Previously presented). The method according to claim 22, wherein the hydrophilic region is the region which possesses the sequence RPIPKPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

38. (Currently amended). The method according to claim 37, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

39. (Previously presented). The method according to claim 38, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

40. (Previously presented). The method according to claim 23, wherein the hydrophilic region is the region which possesses the sequence RPIPKPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

41. (Previously presented). The method according to claim 40, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

42. (Previously presented). The method according to claim 41, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

43. (Previously presented). The method according to claim 24, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

44. (Currently amended). The method according to claim 43, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

45. (Previously presented). The method according to claim 44, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

46. (Previously presented). The method according to claim 25, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

47. (Currently amended). The method according to claim 46, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

48. (Previously presented). The method according to claim 47, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

49. (Previously presented). The method according to claim 26, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

50. (Currently amended). The method according to claim 49, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

51. (Previously presented). The method according to claim 50, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

52. (Previously presented). The method according to claim 27, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

53. (Currently amended). The method according to claim 52, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

54. (Previously presented). The method according to claim 53, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

55. (Previously presented). The method according to claim 28, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

56. (Currently amended). The method according to claim 55, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

57. (Previously presented). The method according to claim 56, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

58. (Previously presented). The method according to claim 29, wherein the hydrophilic region is the region which possesses the sequence RPIPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

59. (Currently amended). The method according to claim 58, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

60. (Previously presented). The method according to claim 59, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

61. (Previously presented). The method according to claim 30, wherein the hydrophilic region is the region which possesses the sequence RPIPKPSPWAPKKHRLSSDQDSQTP (SEQ ID NO:4) in HPV16. or its homologue in other papilloma viruses.

62. (Currently amended). The method according to claim 61, wherein the hydrophilic region is the region which possesses the sequence RP[R]IPKPSPWAPKKHR in HPV16 (SEQ ID NO:167), or its homologue in other papilloma viruses.

63. (Previously presented). The method according to claim 62, wherein the hydrophilic region is the region which possesses the sequence PKPSPWAPKKH(R) (SEQ NO:168) in HPV16, or its homologue in other papilloma viruses.

64. (Previously presented). The method according to any one of claims 2-5, 7-11 and 14-63, wherein the molecule capable of binding to a papilloma virus E4 protein is an antibody or an antigen binding fragment thereof.